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R-TECH NEWSLETTER
 The Newsletter of the First Responder Technologies Program

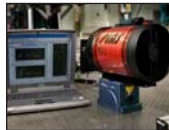
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This Newsletter discusses technologies of interest to first responders that have received funding, in part, from the Federal government. Mention of these technologies should not be construed as an endorsement of either the technology, or the entity producing it, by the Federal government.

To download a copy of this newsletter, visit:
<http://www.firstresponder.gov/Pages/NewsLetterPage.aspx?NewsLetter=current>

BANDING TOGETHER

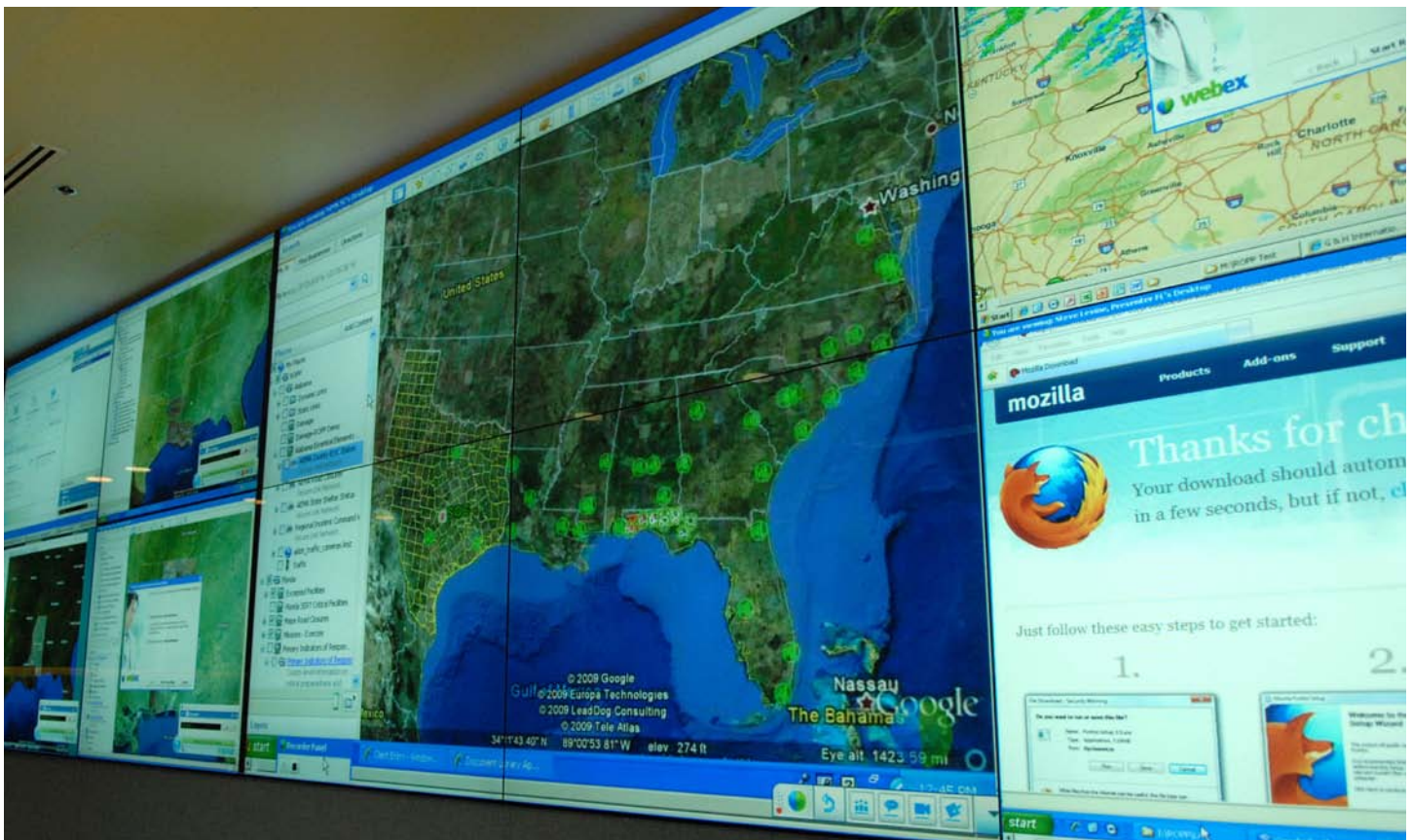
States Lead Nationwide Information-Sharing Effort

Natural disasters know no boundaries. When emergencies occur, states and emergency responders need to share details on evacuation routes, shelter locations, and other information to ensure that citizens receive the relief they need. In the past, if the National Guard wanted to dispatch hundreds of trucks to a hurricane-ravaged area in the Southeast, there was no mechanism for truck drivers to find out if a key road or bridge along the proposed route was closed. Neighboring states had no way of knowing which roads might be jammed with vehicles evacuating the area. First responders hurrying to aid residents outside their jurisdictions had limited ways to learn about local resources available to them.

Interstate access to dynamic operational information – such as weather conditions, traffic, emergency shelter sites, and the locations of gas supplies, critical infrastructure, and power grids – is critical

to emergency responders during an incident. To gain this access and improve disaster response planning, the Southeast region, supported by the Department of Homeland Security (DHS), has been working to find a way to share real-time information from multiple systems using different technological platforms.

Since February 2009, eight southeastern states – Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, Texas, and Virginia – have participated in a pilot program to develop technical and governance solutions to create an inter-state information sharing capability. On November 4, six of these states – Alabama, Florida, Louisiana, Mississippi, Texas, and Virginia – supported by the DHS Science and Technology Directorate (S&T), demonstrated this groundbreaking capability in the Southeast Regional Operations Platform Pilot (ROPP). Georgia was not able to fully participate in



State and national maps show hazardous material spills, weather reports, traffic information, and other data during the Nov. 4, 2009 Southeast Regional Operations Platform Pilot demonstration. Photo courtesy of DHS S&T.

Banding Together (continued)

the demonstration due to flooding in the state.

Hosted by DHS S&T's Command, Control and Interoperability (CCI) Division, in partnership with the First Responder Technologies (R-Tech) program, the demonstration brought together first responders with representatives from state homeland security agencies, emergency management, Capitol Hill, and White House at the Federal Emergency Management Agency's (FEMA's) National Response Coordination Center in Washington, DC. Attendees watched live as the six states in their respective operations centers navigated simulated emergencies and shared critical information.

The regional information-sharing system in the Southeast has helped prepare the participants to assist each other in future emergencies, according to Travis Johns, Information Technology Branch Manager for Applications and Databases in the Louisiana Governor's Office of Homeland Security and Emergency Preparedness. "It's really brought the states closer together," Johns said.

The ROPP demonstration was a milestone in CCI's larger Virtual USA (vUSA) initiative, which is creating a cost-effective nationwide capability that significantly enhances information sharing and decision making. "Today's ROPP demonstration marks the first significant step in the development of a nationwide model for real-time, seamless information sharing during emergencies and day-to-day operations," said Dr. David Boyd, CCI Director.

Based on current and emerging technologies, vUSA integrates existing systems to enable collaboration at the local, state, and federal levels by providing critical context to make information actionable. "It is hugely exciting to see the effective collaboration across agency lines and levels of government that's happening within the Virtual USA community. As a working model of bottom-up, locally-driven data sharing, Virtual USA has transformative



Dr. David Boyd, Director of the DHS S&T Command, Control and Interoperability Division, discusses Virtual USA at the Nov. 4, 2009 Southeast Regional Operations Platform Pilot demonstration. Photo courtesy of DHS S&T.

potential," said Andrew McLaughlin, Deputy U.S. Chief Technology Officer at the Executive Office of the President.

Since its conception in early 2009, vUSA has both helped develop existing initiatives at all levels and drawn upon their experiences. "With improved interoperable technologies and collaborative interactive information sharing frameworks, emergency responders will have access to the information they need, when they need it, to save lives," said Dr. Boyd.

Alabama and Virginia have created statewide systems known as Virtual Alabama and Virginia Interoperability Picture for Emergency Response (VIPER), respectively. Among their capabilities, Virtual Alabama and VIPER use 3-D visualization tools and interactive maps to display evacuation routes, traffic, weather patterns, construction, hospital locations, and other up-the-minute disaster planning data. These systems improve response by ensuring emergency managers at all levels have immediate access to the information they need to make decisions. The City of Beverly Hills, Calif. has also embarked on a multi-jurisdictional initiative to

Banding Together (continued)

launch a Virtual City platform to be shared among partners across California. "DHS has empowered the participating states to lead ROPP by identifying the requirements and establish their objectives and goals," said Christine Lee, R-Tech Program Manager. "This bottom-up approach made the ROPP truly successful in such a short period of time."

Louisiana launched its interactive Google Earth-based mapping software, Virtual Louisiana, in August 2007, and has made it available to more than 2,000 government users nationwide and more than 500 emergency response agencies statewide. Many state troopers and parishes are using the technology to assist in search and rescue operations. One local parish's first responders found a lost child with the help of the technology, said Johns.

Emergency managers are embracing the technology because it is easy to adopt without straining resources, said Jose Vazquez, Director of the DHS S&T R-Tech program. "The practitioners out in the field are very interested in adopting new technology that makes their job easier, but in many cases they don't have much time or resources to dedicate to figuring out how best to integrate it into their current procedures," he said.

Participating in vUSA requires minimal direct financial investment on a state or city's part, according to Jeffrey King, Chief of the DHS S&T Office for Interoperability and Compatibility. Many state and local governments already track evacuation routes and other incident management information in case of an emergency, but the information is often kept in different computer systems. Virtual USA offers those governments a way to seamlessly share information, even if they use different software. "We focus on building

on existing investments," King said. "Through our projects, we're trying to ensure that the right people have access to information on demand and as authorized."

Eventually, local police and fire departments could use vUSA to mobilize resources from multiple states in an emergency, King said, making it easier for states to respond jointly to a disaster near a border. For example, the ROPP allows states to share information about where responders can stage food and water supplies as well as hospital and fire station locations.

The states use national-level data, such as National Weather Service weather and flood reports, to augment information about conditions on the ground, said Dr. William Henriques, FEMA Section Chief for Enterprise Geospatial Services in the Office of the Chief Information Officer. The



Screens show states and federal agencies various views of the same disaster preparedness data during the Nov. 4, 2009 Southeast Regional Operations Platform Pilot demonstration. Photo courtesy of DHS S&T.

Banding Together (continued)

pilot project assists federal agencies in what kind of information they can provide local emergency responders to aid in the response. In turn, federal agencies use the state-provided geospatial data to make better disaster management decisions. "We are in a new age of technology," Henriques said. "Now all information is being mapped, and we have the ability to see and analyze many things geographically."

With the Southeast states having successfully demonstrated the concept of information sharing on Nov. 4, their next step will be to turn the concept into a fully-functional capability that can be used during a region-wide emergency. In the meantime, states in the Pacific Northwest and New England are embarking on their own virtual information-sharing pilots.

First responders readily see the advantage of visualizing data, and the ROPP project has led to two additional pilot projects and interest by other regions in joining. Five states (Alaska, Idaho, Montana, Oregon, and Washington) also are partnering with CCI and R-Tech to implement a pilot program based on lessons learned and best practices from the SE ROPP. These states agreed to create a Pacific Northwest (PNW) Pilot to develop a governance structure comprising multiple working groups to determine their own technical and operational regional requirements.

FEMA Region 1 Preparedness and Disaster Operations Divisions are working with the six New England states – Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont – to research the situational awareness technologies the ROPP participants are using, said Russ Webster, FEMA Region 1 Federal Preparedness Coordinator. Alabama and Virginia participants briefed the New



Chris McIntosh, then Operations Chief for the Virginia Department of Emergency Management, discusses his state's information-sharing platform, VIPER, during the Nov. 4, 2009 Southeast Regional Operations Platform Pilot demonstration. Photo courtesy of DHS S&T.

England states on their systems in September 2009. "I'm confident we can save New England states time, money, and fast-track these amazing technologies that can preserve lives in times when every minute and dollar counts," Webster said. "I'm also very interested in any technology that can help transform America's preparedness culture and better involve each individual, recognizing they will always be their neighbors."

Additional regional and municipal pilot projects will help pave the way to develop nationwide disaster response information-sharing capabilities. "This is a wave that's beginning to gain a lot of momentum," said Vazquez.

To read the White House report on vUSA and other open government initiatives, visit www.whitehouse.gov/sites/default/files/microsites/ogi-progress-report-american-people.pdf. To read DHS Secretary Janet Napolitano's vUSA launch announcement, visit www.dhs.gov/ynews/releases/pr_1260375414161.shtm. To learn more about vUSA, visit www.firstresponder.gov/VirtualUSA.

INVISIBLE FINGERPRINTS

Detector Spots Traces of Explosive Residue

Making bombs leaves chemical traces on a person's hands and the surfaces they touch, but the residue is invisible to the naked eye. This poses a real challenge to law enforcement in identifying suspects and locations where bombs are being made. Fortunately, a detector developed at Oak Ridge National Laboratory (ORNL) makes that residue visible. The Photo-Induced Acoustic Spectroscopy (PIAS) Detector, could help officers identify suspects based on the chemical traces left behind on objects they touch.

ORNL developed the PIAS Detector with funding from the Department of Defense (DoD) Office of Naval Research (ONR). The Department of Energy (DOE) National Nuclear Security Administration (NNSA) Office of Nonproliferation Research and Development contributed funding for using the detector to identify biological agents from a distance.

The PIAS Detector identifies substances by analyzing how molecules absorb different colors of light, a method known as spectroscopy. No two molecules have the same absorption profile in the mid-infrared light spectrum, said Larry Senesac, ORNL Research Scientist and Research Assistant Professor at the University of Tennessee. The detector's laser illuminates the suspected explosive and scans it with different colors of light, all of which are invisible to the naked eye. The detector then analyzes which colors the unknown substance absorbs and which

it reflects. The detector searches its library to match the light absorption levels to known materials. According to Senesac, explosives such as TNT have very specific light absorption levels, and the detector can easily identify such substances based on their distinct signatures.

The detector uses this process to find the minute traces of explosives bomb makers leave behind, according to Senesac. Similar to the way people who touch greasy substances leave fingerprints behind, chemical residue rubs off on any surface a bomb maker touches after handling explosives. ORNL researchers are continually refining the detector so it can spot the smallest traces of explosives residue, said Senesac. Currently, even if a terrorist touched 100 different objects after handling explosives, the detector could still identify the traces left on the last object the bomb maker held. "Everything you touch ends up having this literal fingerprint of explosives on the surface," he said.

The detector will allow police to scan for traces even when standing a safe distance away from a suspected explosive, said Senesac. Researchers have successfully used the detector to find explosive traces left on door handles or other objects up to 50 meters away. This will allow officers to safely investigate a suspected bomb without approaching it. Depending on the laser, the detector could work from up to 100 meters away, said Senesac.

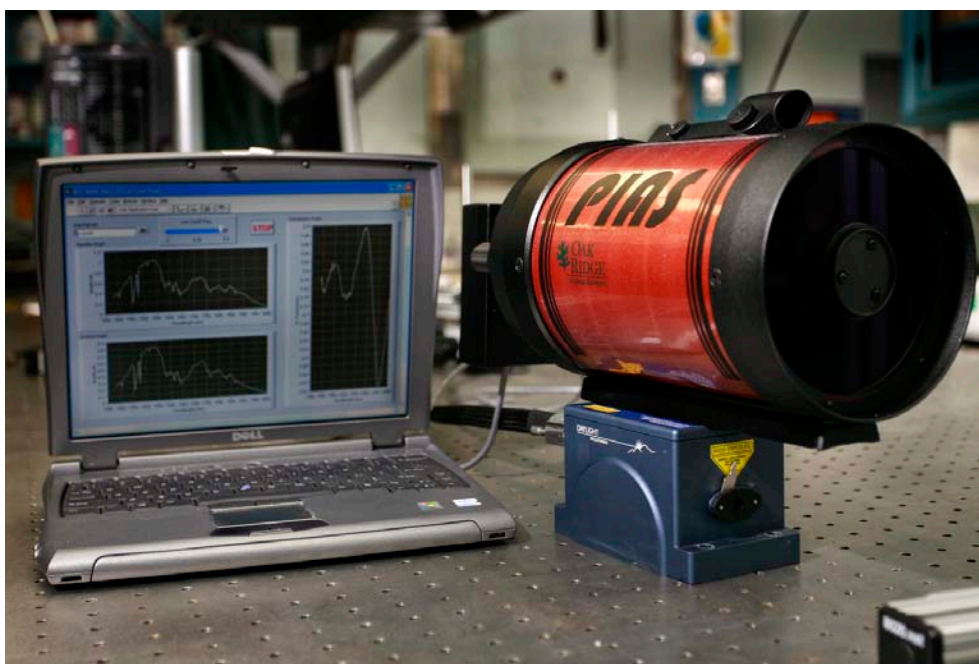


Photo courtesy of Oak Ridge National Laboratory.

"The ability to detect and identify trace amounts of explosive residues at safe standoff distances, and with modest optical power and optics, represents a significant advancement in explosive detection capability," said Peter J. Vietti, DoD ONR spokesman. "A key technical innovation was to vastly improve [the] signal-to-noise [ratio] by using an acoustic feedback loop...to format and discriminate low-level signal from background."

In addition to explosives, ORNL's design can be used to detect a variety of other chemicals. DOE NNSA provided funding for the project to see if the detector could also be used to check for

Invisible Fingerprints (continued)

the production of nuclear materials. "NNSA sponsorship of a range of nuclear nonproliferation-related technology development is often useful for other applications or dual-use," said DOE NNSA Assistant Deputy Administrator for Nonproliferation & Verification Research & Development, Dr. T. Jan Cervený. "The Oak Ridge National Laboratory project on photo-acoustic spectroscopy is such an example. Our sponsorship of this project was to further U.S. capability to remotely determine if nuclear materials are being produced. However, the same techniques can also be used to identify other chemicals, such as explosives."

Spectroscopy devices, such as the PIAS Detector, can detect more than 100,000 chemicals, said Senesac, with a potential for multiple uses. For example, the PIAS Detector could be used to locate drugs. Methamphetamine cooks leave traces of the distinctive chemicals used to make the drug on other objects they touch. According to Senesac, law enforcement could use detectors to check luggage in airports, scan vehicles at border crossings, or check post office packages for drugs or explosives.

ORNL started developing the detector about three years ago. According to Senesac, DoD is testing the prototype detector at the Naval Air Weapons Station in China Lake, California. After that prototype is perfected, the detector could be licensed to a manufacturer for commercialization. Senesac added that he hopes to have a smaller, portable device ready for testing in early 2010.

The completed prototype will help first responders identify explosives without risking their safety, said Senesac. Using the final detector, responders will be able to tell at a glance whether an unknown chemical is safe or dangerous. Law enforcement will not have to approach a bomb in order to identify it. "The difference here is we're [identifying explosives] from a distance..." Senesac said. "This is non-contact."

For more information on the PIAS Detector, visit www.ornl.gov.

PATTERNS TO PREPAREDNESS

Hazmat Responders Share Information through National Fusion Center

When firefighters and police rush to the scene of a chemical spill, they rely on their experience and training to deal with the emergency. With the growing variety and amount of hazardous materials being transported around the country, the possible variations within chemical spill emergencies have the potential to be overwhelming. To address this, the National Hazardous Materials Fusion Center (Hazmat Fusion Center) is building a database cataloguing hazardous material releases to help responders identify industry best practices through shared information in responder safety, training, and lessons learned.

The Hazmat Fusion Center is developing a secure Internet portal and toll-free phone system to collect hazmat incident reports, according to the Department of Transportation (DOT), which funds the center. The Fairfax, Va.-based center was formed in 2007 through a partnership among the DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) and the International Association of Fire Chiefs (IAFC). The Hazmat Fusion Center's Advisory Working Group includes representatives from the International Association of Fire Fighters, the National Association of State Fire Marshals, the National Volunteer Fire Council, the U.S. Coast



Two Atlantic Strike Team members enter the "hot zone" at a hazmat response in Quincy, Mass. Roughly 100 drums containing unknown chemicals and several other hazardous materials were assessed for safe removal. Photo courtesy of the U.S. Coast Guard.

Patterns to Preparedness (continued)



Firefighters train hoses on a rail tank car fire during a training exercise. Photo courtesy of DOT PHMSA.

Guard, the Federal Emergency Management Agency, the National Fire Academy, the Federal Railroad Administration, and the Federal Motor Carrier Safety Administration. The participation of so many agencies has enabled the center to provide valuable resources to help responders identify critical hazmat patterns, collaborate with one another, and improve training methods.

"[The Internet portal] helps you to understand what's happening in the real world with the shipping of hazardous material," said Joe Delcambre, a PHMSA spokesman. More



Police respond to a fire after an ethanol tanker truck overturned in Baltimore in 2007. Photo courtesy of DOT PHMSA.

than 800,000 shipments of hazardous materials travel the nation's roads, railroads, and waterways each day, according to DOT. While the nation's economy relies on these shipments, they can pose a safety risk if one accidentally releases a chemical into the environment.

In addition to the Hazmat Fusion Center, DOT officials also will use the recently developed HazMat Intelligence Portal to study routine shipments of hazardous materials and ensure local hazmat responders are prepared to handle potential accidents, Delcambre said. PHMSA awarded \$20.9 million in Hazardous Materials Emergency Preparedness grants to states, territories, and Native American tribes in October 2009 to help train first responders to react to incidents involving hazardous materials and assist in preparing emergency response plans.

Beyond studying past hazmat incidents, the Hazmat Fusion Center provides a venue where first responders can share their experiences and discuss best practices. The center is creating a secure section of its Website where first responders can record information about how they responded to hazmat incidents, said Thomas Wells, the IAFC program manager for the center. The center will analyze the first responders' discussions to examine nationwide trends in hazmat spills and share that information with agencies that respond to chemical releases, regardless of discipline. The secure section is slated for launch in the spring or summer of 2010, according to Wells.

Patterns to Preparedness (continued)

First responders also can turn to the center for assistance in evaluating the response to a specific chemical release incident. Fire departments, police departments, emergency medical services, and other agencies can invite the center's Regional Incident Survey Teams to evaluate the way a department addressed a hazmat incident, said Wells. The teams have produced about 10 incident reports, all of which are in revision for posting on the Website. The executive summaries are scheduled to be posted by the end of 2009, said Wells. These reports examine which practices worked and which could be improved in handling a chemical release.

Once the reports are posted, members of the public will be able to view executive summaries, but the responding department's identity and location will be cloaked for privacy purposes. Hazmat responders will have access to more complete reports on the secure Website, but identifying information will still be kept private. Wells said

the idea is to share lessons learned, not to assign blame to responders. "We're looking to really draw those good lessons from folks who were on response and translate that into smart practices for the rest of the country," he said.

The center also provides training resources for hazmat responders, said Cmdr. Edward Bock, Chief of the Oil and Hazardous Substances Division for the Coast Guard's Office of Incident Management and Preparedness. Among these resources is guidance on how to handle ethanol and biodiesel spills, now more common as the use of alternative fuels increases. These resources also include information about new techniques for responding to chlorine releases. Bock said, "I look forward to being able to delve in and examine some of those lessons learned and share those with other responders."

For more information on the Hazmat Fusion Center, visit www.hazmatfc.com.



A first responder heads to the scene of an overturned tanker truck. The Hazmat Fusion Center collects reports on chemical spills like this one. Photo courtesy of DOT PHMSA.



RESPONDER KNOWLEDGE BASE

Watch List on RKB

First responders can find out when new grants are available or when new products are available using Responder Knowledge Base (RKB) without having to check the site itself. The Website, located at www.rkb.us, provides emergency responders, purchasers, and planners with trusted information on certifications, standards, grants, and equipment. One of the many features RKB offers its users is the Watch List, which notifies subscribers when new content is added or categories are updated that are important to them.

The RKB Watch List is simple and easy to use. Once a user becomes a registered RKB member, he or she can go to the "My RKB" tab and select "My Watch List." From there, users can regulate which items they want to track and how often they want to receive optional e-mail notifications. The Watch List automatically tracks when new content is added or updates are made to categories selected by the user.

RKB, which introduced the Watch List and other customization options in June 2008, has added more options for customizing the site. RKB added more subcategory options to the Watch List feature. For example, instead of receiving notifications about all grants, you can specifically select FEMA Preparedness Grants, Department of Justice Grants, Other Grants, or Assistance Programs. This helps streamline the information users receive based on specific, individual needs.

Another modification is that notifications on new System Assessment and Validation for Emergency Responders (SAVER) documents are sent directly by the SAVER program, allowing for more timely updates of this information. To receive e-mails when new SAVER information is available, click "Edit My Watch List" and select the default option under "SAVER Documents."

For users who prefer not to receive weekly e-mails, they have the option to log in at any time and view new items in the Watch List for the past seven, 14, 30, 90, or 180 days.

For more information on RKB's Watch List, please visit www.rkb.us. For questions or suggestions, please e-mail the RKB at RKBMailbox@us.saic.com or call 1-877-FEMA-RKB (1-877-336-2752).